

III. AFFECTED ENVIRONMENT

A study area encompassing the build alternatives was examined through detailed studies of socioeconomics, natural resources, air quality, noise, and cultural resources.

A. SOCIAL ENVIRONMENT

1. Land Use and Zoning

a. Existing Land Use

Land use in the study area is predominantly forest land with rural residential development along Route 26 and around Sabbathday Lake (Figure III-1). Other land uses in the study area include agricultural and commercial uses.

Land uses in the study area along the southern most portion of Route 26 from the Gray/New Gloucester town line to Snow Hill Road are a mix of residential and commercial uses. Year-round and seasonal residences are found in the vicinity of Sabbathday Lake. Forest and rural residential uses are along Route 26 from the Shaker Village to Sabbathday Lake. Between the Shaker Village and Shaker Hill, land uses along Route 26 are forested or agricultural. Residences line the sides of Route 26 over Shaker Hill mixed with forest and several agricultural areas. The intersection of Route 26 with Route 122 in Poland includes rural residential and commercial development.

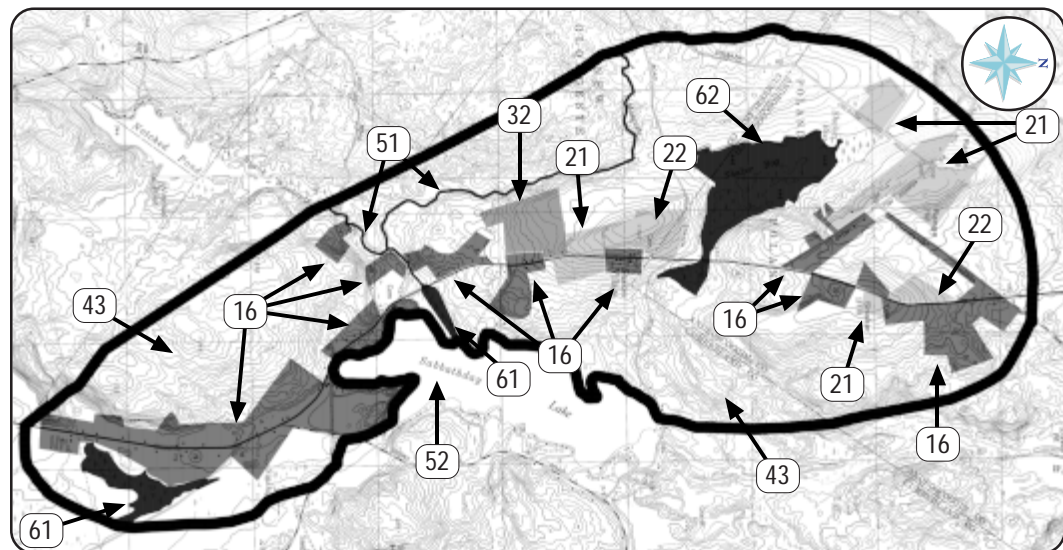


Figure III-1, Existing land use/land cover

Scale 1:60,000

Map Legend — Anderson Level II Classifications

Number	Classification	Number	Classification
16	Mixed Urban or Built-up Land	43	Mixed Forest Land
21	Cropland or Pasture	51	Streams & Canals
22	Orchards, Groves, Vineyards, Nurseries & Ornamental Horticulture Areas	52	Lakes
32	Shrub & Brush Range	61	Forested Wetland
		62	Non-Forested Wetland

One unique element of the study area is the Shaker Village at Sabbathday Lake. The Shaker Village at Sabbathday Lake is a National Historic Landmark and the only active Shaker community in the United States. The Shaker property, which straddles the New Gloucester/Poland town line, consists of a cluster of historic structures, a cemetery, agricultural fields, orchards, and pastures surrounded by forests.

b. Future Land Use

The Town of New Gloucester has designated most of the study area as a rural area, with the majority placed in a rural resource category — an area of agriculture, forestry, and low density residential development. The shores of Sabbathday Lake and Wescott Brook are designated as shoreland resource. This designation is based on state regulations that apply within 101 m (250 ft.) of lakes and streams and limit or restrict development in those areas. The Shaker Village and property is designated historic preservation for a distance of 242 m (600 ft.) to the east and west of Route 26, wherein uses are restricted and performance standards govern new construction and renovations. The land immediately adjacent to both sides of Route 26 from the Gray/New Gloucester town line to Snow Hill Road has been categorized as village growth, a “growth area” (Figure III-2) allowing moderate density residential development in a mixed use setting (Town of New Gloucester 1991).

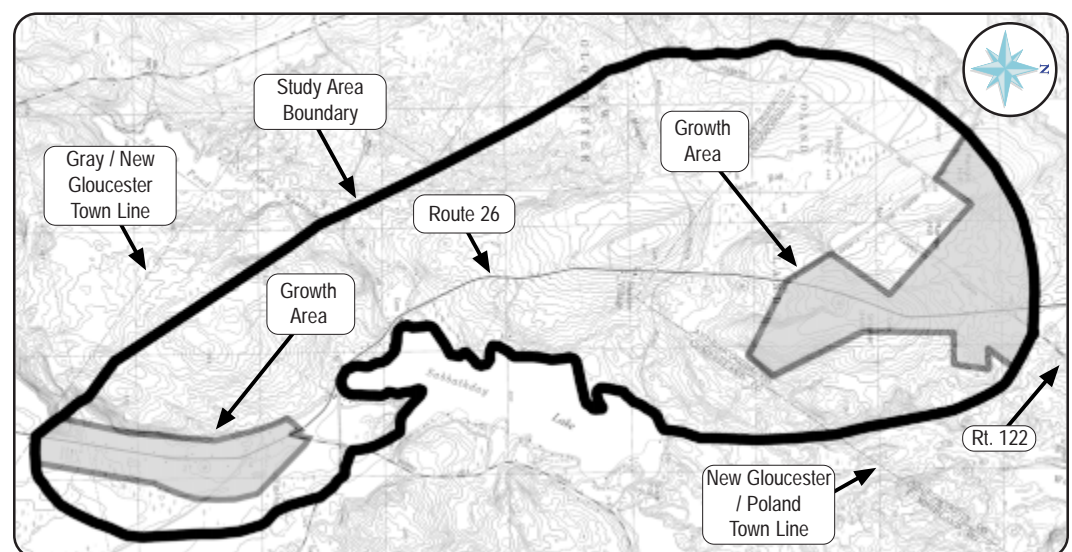


Figure III-2, Growth areas

Scale 1:60,000

The Town of New Gloucester indicated that the village growth category would be ineffective and inappropriate with increasing traffic on Route 26. However, if this section of Route 26 is bypassed, then the village growth classification would be appropriate. According to the Town of New Gloucester, a bypass to the west of Route 26 would present an opportunity for economic development for the Town. An area immediately south of the Shaker property between Route 26 and Mosquito Brook would be a good location for an office/light industrial park in a rural setting (Faunce, Robert 1997).

The Town of Poland has planned for “growth areas” adjacent to Route 26, while the balance of the study area is designated as “rural areas” (Figure III-2). Much of the “rural area” is designated as farm and forest, an area of open space and low density residential uses with the balance in a rural residential category, allowing low density residential uses. Shaker Hill is designated as a traditional village, an area of moderate residential density. The intersection of Route 26 with Route 122 has been designated as general business (Town of Poland 1991).

c. *Zoning*

Both Towns have adopted zoning ordinances which, in general, follow the guidance of the respective Master Plans. New Gloucester has zoned most of the study area as farm and forest or rural residential; both districts allow low density residential and agricultural uses (Figure III-3). Route 26 from the Gray/New Gloucester town line to Snow Hill Road is zoned as a residential commercial district, permitting a broad mixture of commercial and residential uses. A lake district surrounds Sabbathday Lake and a resource protection district encompasses Wescott Brook; both districts allow low density residential uses. The Shaker property immediately adjacent to Route 26 is in a historic overlay district, which controls the siting of new structures and the renovation of existing structures. The majority of the study area is a groundwater protection overlay district in recognition of the protection of the underlying aquifer. This district limits uses that could degrade water quality (Town of New Gloucester 1991).

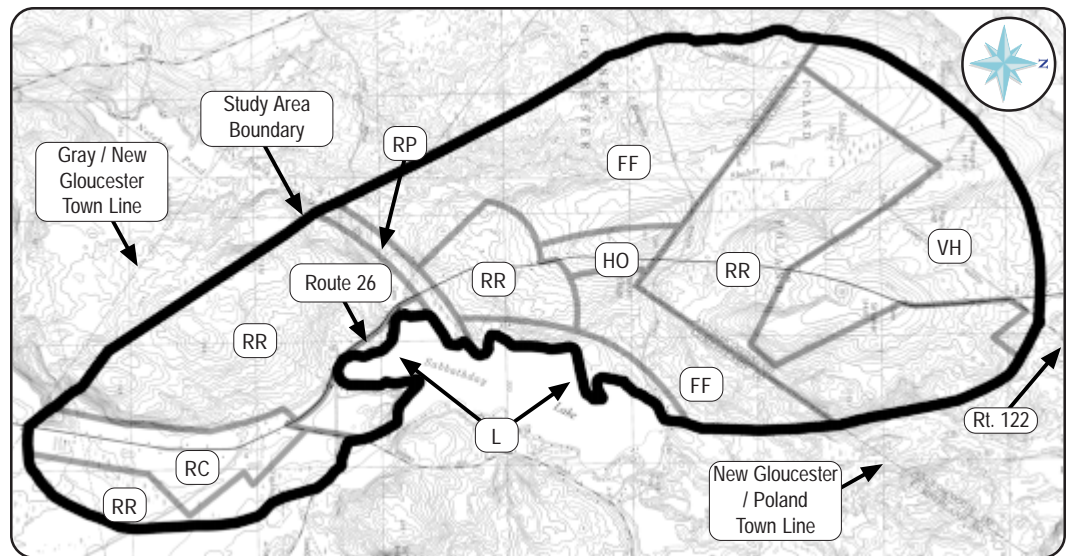


Figure III-3, Zoning map

Scale 1:60,000

Map Legend		
FF Farm & Forest	HO ... Historical Overlay	L Lake
RC Residential / Commercial	RP ... Resource Protection	RR ... Rural / Residential
VH Village Historical		

In Poland, Shaker Hill and the intersection of Routes 26 and 122 are included in a village historical zone while the balance of the study area is zoned rural residential (Figure III-3). These districts allow a similar mix of residential and non-residential uses at low densities (Town of Poland 1991).

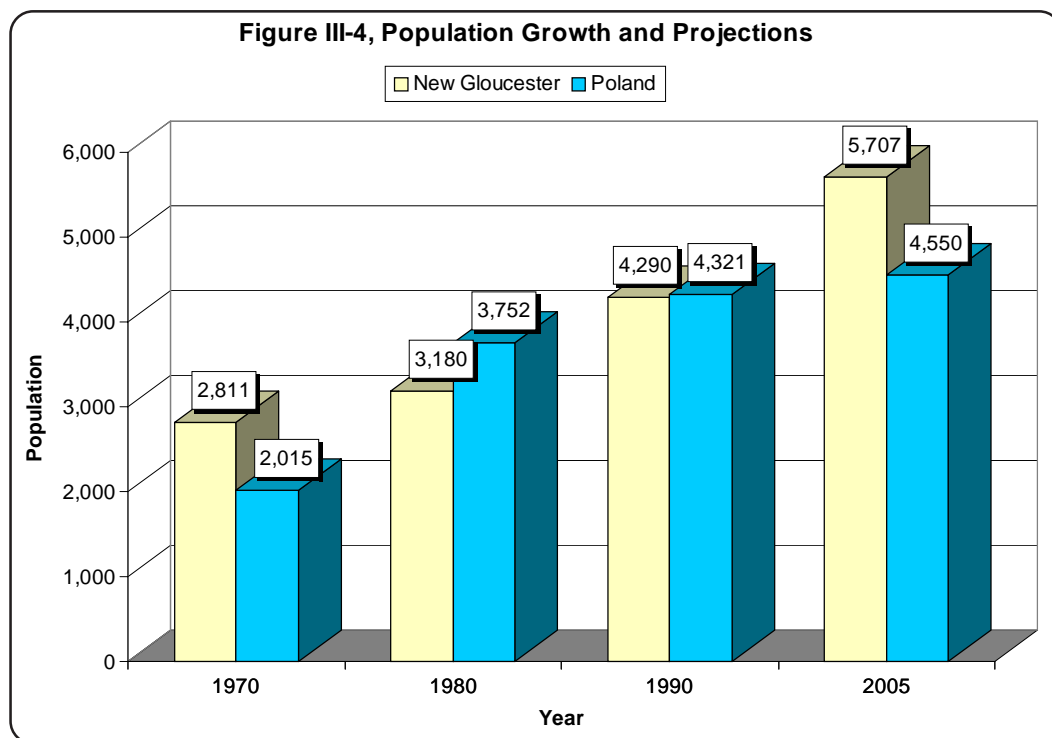
2. Community Characteristics

a. Population and Housing

Portions of both Cumberland and Androscoggin Counties are in the study area. These two counties are Maine's largest and fifth largest counties in population, respectively. Together, they comprise 28.4 percent of the state's population in 1990 (U.S. Census, 1990). The Towns of New Gloucester and Poland are in the rural portions of Cumberland and Androscoggin Counties, respectively.

While the Towns of New Gloucester and Poland are categorized as rural, both were among the fastest growing communities in Maine in the 1970s and 1980s. Because of this growth, each town updated their respective comprehensive plans in 1991. The growth in the Portland and Lewiston-Auburn areas impacted these communities which are in easy commuting distance of these two urban centers.

New Gloucester's population growth was greater in the 1980s (35 percent) than in the 1970s (13 percent) (Figure III-4). The Town's growth exceeded that of the County, and a limitation on residential building permits was enacted in 1987. New Gloucester's population is expected to continue to grow at a more rapid rate than the population of Poland.

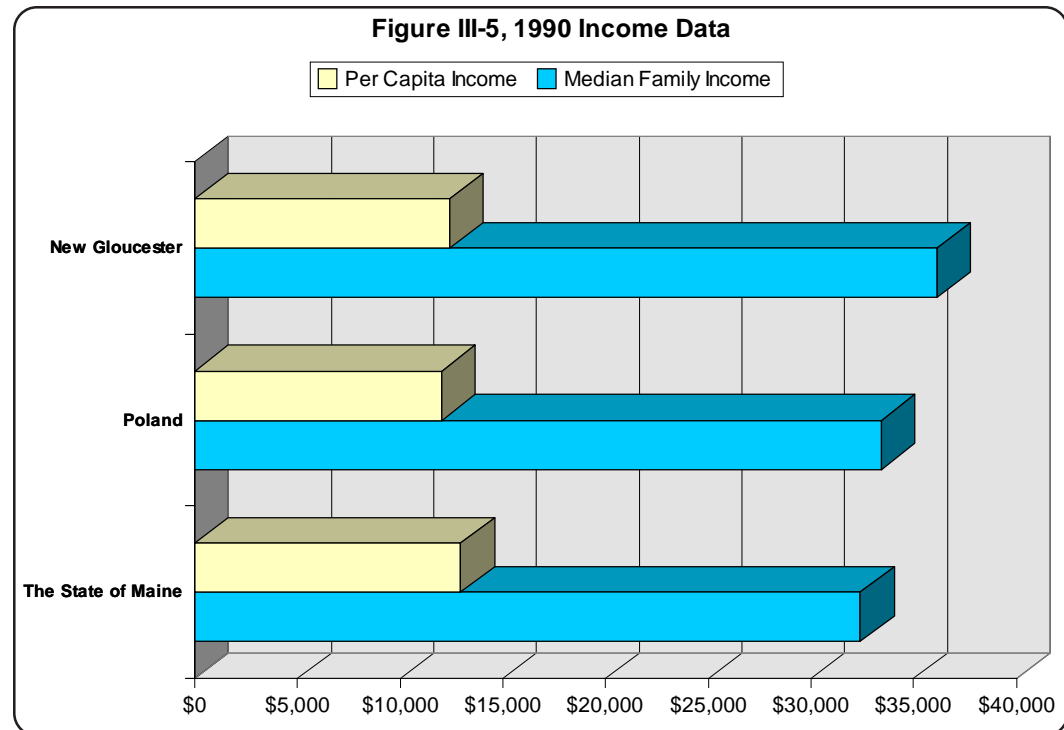


In the Town of Poland, the population began to increase noticeably in the 1960s. Poland experienced its most substantial increase of this century in the 1970s, when the Town's populace increased by 86 percent (Figure III-4). The population increased another 15 percent in the 1980s. The Town's growth rate in the 1980s might have been more pronounced; but in 1979 Poland implemented an ordinance limiting the number of new residential permits per year. Poland is expected to continue to grow, but at a rate about two-thirds of that experienced during the 1980s.

In response to growth and job opportunities in greater Portland and the Lewiston-Auburn area, housing units in both Towns increased substantially during the two decade period beginning in 1970. The housing stock in both communities is predominantly single family units, and a substantial number of these are mobile or manufactured homes. Both communities have a number of seasonal dwellings, particularly New Gloucester, where about 10 percent of the housing units are seasonal (Town of New Gloucester 1991).

b. Income

Per capita income for the study area is about the same as that for the balance of the two communities. Per capita income for Poland and New Gloucester in 1990 were slightly below, but comparable, to the per capita income for the state of Maine (Figure III-5).



c. Minorities

No concentrated populations of minorities are known to reside in the study area (U.S. Department of Commerce 1990).

d. *Age and Sex Distribution*

Poland and New Gloucester have younger populations than their respective counties and the state. There are no senior citizen communities or assisted care facilities within the study area.

e. *Education*

In New Gloucester, 73.7 percent of adults have a high school education, 19.6 percent have undergraduate degrees, and 7.8 percent have graduate degrees (U.S. Census, 1990).

In Poland, 76.8 percent of adults have a high school education, 10.9 percent have undergraduate degrees, and 2.4 percent have graduate degrees (U.S. Census, 1990).

f. *Renter Occupied Housing Units*

The two Towns have a substantially smaller percentage of renter occupied housing units than either of the respective counties or the state (Table III-1). The average rent in New Gloucester is substantially above the statewide median contract rent while the average rent in Poland is slightly below the statewide median.

Table III-1, Renter Occupied Housing Data

Jurisdiction	% of Renter Occupied Units	Median Contract Rent	Vacancy Rate
New Gloucester	12%	\$446	10.4%
Poland	11%	\$348	6.2%
The State of Maine	29.5%	\$357	8.4%

3. **Community Facilities and Services**

a. *Educational Facilities*

No educational facilities are in the study area; students within the study area are bussed to school in New Gloucester and Poland.

b. *Religious Facilities*

The only religious facility in the study area belongs to the United Society of Shakers. The Shakers hold worship services in the Meeting House immediately adjacent to Route 26 within the Shaker Village.

c. *Emergency Facilities*

There are no emergency facilities in the study area.

d. *Health Care Facilities*

A medical and dental office is located in the study area near the intersection of Routes 26 and 122.

The Towns are served by hospitals and other health-related facilities in the Lewiston-Auburn and greater Portland areas.

e. *Transportation Services*

Public transportation in New Gloucester is provided by Regional Transportation Program, Inc., in Portland which schedules its services by appointment on a one-day-a-week basis. A local volunteer ride service is available in Town.

There are no public transportation services available in Poland.

f. *Recreational Facilities*

There are no public recreational facilities within the study area.

g. *Cemeteries*

There are five cemeteries within the study area. In New Gloucester, there is a cemetery on the Shaker property adjacent to the Poland town line on Route 26. A town cemetery abuts Route 26 between Brackett and Pond Roads, west of Sabbath-day Lake. In Poland, a Shaker cemetery abuts Route 26 atop Shaker Hill. A second cemetery lies east of Route 26 on Shaker Hill. The last cemetery is in the northwestern portion of the study area along Range Hill Road.

h. *Other Governmental Services*

There are no other governmental facilities in the study area.

4. **Economic Characteristics**

a. *Employment*

Fewer than half of the residents of New Gloucester were in the labor force in 1990 (Table III-2). In contrast, more than half of the residents of Poland were in the civilian labor force, slightly above the proportions for the state.

Table III-2, Labor Force Characteristics

Jurisdiction	Civilian Labor Force	% of Tot. Pop. in Labor Force	% of Females in Labor Force	% of Labor Force Unemployed	% of Labor Force Working within Resident Jurisdiction
New Gloucester	2,011	46.9%	45.1%	5.6%	19.9%
Poland	2,265	52.4%	46.2%	4.8%	15.0%
The State of Maine	612,564	49.9%	46.4%	6.6%	96.6%

Unemployment in both Towns was below the state average (U.S. Dept. of Commerce 1990).

More than 80 percent of the employed residents of the two Towns commute to work outside of their respective Town (U.S. Dept. of Commerce 1990). This statistic is explained both by the relatively limited amount of economic development within these Towns and by the employment opportunities available in the nearby urban centers.

b. *Industry of Employed Persons*

Poland has more residents in manufacturing and fewer in services and wholesale and retail trade than the other jurisdictions, and has 10.1 percent of its residents employed in the construction industry, considerably more than other jurisdic-

tions. In contrast, New Gloucester has a substantially larger percentage of residents employed in the finance, insurance, and real estate industry, and relatively fewer in manufacturing.

5. Pedestrian and Bicycle Use

According to “You Can Get There From Here, Volume One, The Bicycle Plan,” the Gray Bikeway is located to the south of the study area (MDOT 1995). This bikeway is described as an “on-road” route and is designated by roadside signs north to the Gray-New Gloucester town line. A publication entitled Cumberland County Regional Trails Plan (1997) prepared by the Regional Trails Plan Advisory Committee of the Greater Portland Council of Governments cites a proposed regional trail along the Central Maine Power Line in the southern portion of the study area as a potential link in a regional trail network. The trail is used by local snowmobilers and mountain bikers. Bicycle traffic along Route 26 is limited to the neighborhood and local networks and regional bicycle traffic avoids the corridor due to the narrow roadways and the volume of truck traffic.

Pedestrian traffic along Route 26 is limited due to safety concerns, except between the Grange Hall and Sabbathday Lake and within the Shaker Village.

6. Visual Resources of Historic Properties

NEPA requires that proponents of Federally-funded actions consider potential impacts on visual resources, but primary consideration is given to the resources protected under the National Historic Preservation Act of 1966. The limits of the visually sensitive area have been defined as the Route 26 corridor from north of Potters Lane to south of the crest of Shaker Hill, and encompassing the buildings, farm fields, and stone walls of the Shaker Village (Maine Historic Preservation Commission (MHPC) 1997).

The study area encompasses a primarily rural environment of rolling hills. Elevations range from 91 m (300 ft.) in the relatively flat southeastern portion of the study area to 186 m (610 ft.) on Shaker Hill in the northern portion of the study area. Steeply sloping bedrock outcrops can be observed to the west of Route 26 along the Central Maine Power line in the extreme southern portion of the study area.

The major water resources in the study area are Sabbathday Lake and Shaker Bog. The majority of the study area drains toward the east via Mosquito Brook and the outlet from Shaker Bog, to Sabbathday Lake. Sabbathday Lake is a Great Pond (surface water exceeding 10 ac.) and a local recreational resource with a private beach along Route 26 at its southern shore. Numerous seasonal and year round homes are along the shoreline. Sabbathday Lake is used extensively by recreational fishermen and other boaters and portions of the habitat associated with Mosquito Brook and Shaker Bog are used by deer and duck hunters (MDIFW 1997).

The study area contains a variety of vegetation including dense hardwood forests, old growth conifers, wetland vegetation, open fields, and orchards. Most of the western and northeastern portions of the study area are unfragmented wildlife habitats covered with mixed hardwood and conifer forests. Farmland, the most notable being portions of the Shaker Village, includes an orchard, pasture, and gardens. A row of mature sugar maple trees lines the western side of Route 26 in the Shaker Village affording shade and enhancing its rural character.

The dominant man-made feature within the study area is the Shaker Village. The Shaker Village and property are listed on the National Register of Historic Places as a National Historic Landmark. The United Society of Shakers owns approximately 729 ha (1,800 ac.) of land on which was constructed a number of buildings, including living quarters, a library, a museum and gift shop, and a meeting house. The oldest building at the site was constructed circa 1760 and predates the Shaker community. The first communally erected building was the Meeting House, a white colonial style structure built in 1794. The brick “Dwelling House” was designed by architect Francis Fassett of Portland and constructed in the Victorian style.

The Shaker complex includes woodland, hay fields, gardens, pasture land, an orchard, a cemetery, and stone walls lining Route 26 and much of the property boundary. The rural character of the area is highlighted by an apple orchard, west of Route 26 on approximately 14.2 ha (35.0 ac.) of land, and approximately 6.1 ha (15.0 ac.) of land south of the apple orchard leased to a local farmer who grows corn, pumpkins, squash, and raspberries. A 4.0 ha (10.0 ac.) field south of the Village on the east side of Route 26 is leased to local farmers and used to grow hay. Views from Route 26 across these fields afford an excellent scenic vista to the east toward Sabbathday Lake. The historic nature of the well-maintained buildings and grounds, the mature stand of maple trees and classic stone walls lining Route 26, and the scenic vista from the existing highway combine to form an area of high visual quality.

The visual sensitivity of the area is a function of the scenic vistas, the unique character, and the historic nature of the Shaker Village. The Village has been a part of the local history since 1782 (New Gloucester 1991) and is one of only 19 such enclaves in the country. It is regionally important, drawing approximately 12,000 visitors per year to the area. Route 26 bisects the Shaker Village; the increase in traffic has detracted from the visual quality of the area by creating a visual barrier.

7. Farmlands

Agriculture has historically played an important role in the development of the study area, particularly in the vicinity of the Shaker Village. Data listed in the New Gloucester and Poland comprehensive plans indicate that, as of 1990, there were 818.5 ha (2,022.0 ac.) and 488.1 ha (1,205.8 ac.) of active farmland in the towns, respectively. The northwestern portion of the study area in New Gloucester from north of Pond Road to the Poland town line and the majority of the property

north of Sabbathday Lake are included in the Town's Farm and Forest Zone. Areas of agricultural land in the study area are Shaker Village, two locations on Shaker Hill in Poland, and two locations along Range Hill Road.

The Farmlands Protection Policy Act (FPPA) of 1981 [7 USC 4202, Section 1541 (b).] provides guidelines to Federal agencies which propose projects that may require the conversion of farmland to nonagricultural uses.

To address potential impacts to farmlands, a soil classification system based on soil characteristics is used. This classification of farmland consists of four categories: prime farmland, unique farmland, additional farmland of state-wide importance, and additional farmland of local importance. Areas of soils in these categories that are covered with structures or pavement are considered to have been irreversibly "converted" and no longer available for agricultural production (Table III-3).

Table III-3, Important Farmland Soils in the Study Area

Soil Name and Description (Map Symbol*)	Classification
Charlton fine sandy loam, 3 to 8 % slope (CfB)	Prime Farmland
Deerfield loamy sand, 3 to 8 % slope (DeB)	Prime Farmland
Hermon sandy loam, 3 to 8 % slope (HgB)	Prime Farmland
Hinckley gravelly sandy loam, 3 to 8 % slope (HIB)	Prime Farmland
Paxton fine sandy loam, 3 to 8 % slope (PbB)	Prime Farmland
Paxton fine sandy loam, 8 to 15 % slope (PbC)	State-wide Importance
Woodbridge loam, 0 to 8 % slope (WrB)	Prime Farmland

* U.S. Department of Agriculture Soil Survey for Cumberland County, Maine;

U.S. Department of Agriculture Soil Survey for Androscoggin and Sagadahoc Counties, Maine

A substantial portion of the study area is underlain by prime farmlands and farmlands of state-wide importance. Prime farmland soils and soils of state-wide importance have been mapped around Shaker Village and on Shaker Hill and Range Hill in Poland. A large area of soils that are classified as "prime farmlands if irrigated" underlies the southeastern corner of the study area. There are no unique farmland soils in the study area. There are approximately 35.6 ha (88.0 ac.) of active farmland in proximity to the proposed alternatives: approximately 25.5 ha (63.0 ac.) at the Shaker Village; 2.0 ha (5.0 ac.) at the farm to the south of the Shaker property on the western side of Route 26; 0.8 hectare (4.0 ac.) on the eastern side of Route 26 near the top of Shaker Hill; and 6.5 ha (16.0 ac.) used to grow landscaping trees and shrubs on a parcel on Shaker Hill.

8. Traffic

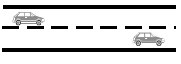
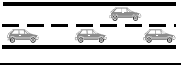
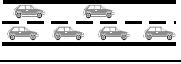
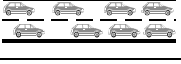
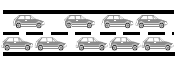
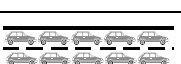
Historical traffic data on Route 26 indicates that traffic has grown at a steady rate of 3 percent per year (MDOT Traffic Analysis 1997) and is expected to continue (Table III-4).

Table III-4, Selected Daily and Peak Hour Traffic Volumes

Location	Existing 1997		No-Build			
	PM Peak Hour	AADT	2000 PM Peak Hour	2000 AADT	2020 PM Peak Hour	2020 AADT
Rt. 26 N. of Range Hill Rd.	580	5,890	630	6,420	980	9,950
Rt. 26 at New Gloucester / Poland Town Line	630	5,860	685	6,390	1,060	9,900
Rt. 26 S. of Snow Hill Rd.	745	7,570	810	8,250	1,260	12,790
Rt. 26 at Gray / New Gloucester Town Line	705	7,240	670	7,890	1,190	12,240

Typically, increases in traffic volume lead to increased traffic congestion. The degree of congestion is often defined by the “Level of Service” (LOS). LOS designations range from “A”, which provides free flow and no traffic delays, to “F”, which consists of vehicle backups and traffic jam conditions (Table III-5).

Table III-5, Level of Service for Roadways

Level of Service	Traffic Flow Condition
A 	Free Flow Operations Affords the motorist a high level of physical and physiological comfort
B 	Reasonably Free Flow Operations Ability to maneuver within traffic stream only slightly restricted
C 	Stable Operations Small increases in flow will cause substantial deterioration in service
D 	Bordering on Unstable Flow Freedom to maneuver within traffic stream is severely limited
E 	Extremely Unstable Operations Maneuverability is extremely limited and level of physical and psychological comfort afforded the motorist is extremely poor
F 	Forced or Breakdown Flow Traffic jammed

LOS analysis of intersections was performed for the existing 1997, future 2000, and 2020 no-build conditions at 6 intersections: (1) Route 26 at Route 122 and Carpenter Road; (2) Route 26 and Range Hill Road; (3) Route 26 at Quarry Road and Outlet Road; (4) Route 26 and Pond Road; (5) Route 26 and Snow Hill Road; and (6) Route 26 at Mayall Road.

The results of the LOS analysis indicate that:

- Under 1997 existing conditions, the critical movements at these intersections operate at LOS C or better.
- Under 2000 no-build conditions, the critical movements at these intersections operate at LOS C or better.

- Under 2020 no-build conditions, the critical movements at these intersections operate at LOS C or better, except for the Route 26/Route 122/Carpenter Road and Route 26/Snow Hill Road intersections. The westbound left-turn movement from Route 122 and the combined left and right-turn movements from Snow Hill Road are projected to operate at LOS E by 2020 (MDOT Traffic Analysis 1997).

LOS analyses of roadway sections was performed for the existing 1997, future 2000, and 2020 no-build conditions for the following sections of Route 26:

- Section 1 - Route 26 from Route 122/Carpenter Road to the New Gloucester/Poland town line.
- Section 2 - Route 26 from the New Gloucester/Poland town line to Snow Hill Road.
- Section 3 - Route 26 from Snow Hill Road to New Gloucester/Gray Town line.

All sections are projected to operate at LOS D or better under existing 1997 and 2000 and 2020 no-build conditions with one exception: Section 1 is projected to decline to LOS E conditions by 2020 (MDOT Traffic Analysis 1997). If traffic volumes continue to increase and roadway improvements are not made, then intersection and roadway section capacity along Route 26 will generally worsen. Several locations are anticipated to operate at a deficient LOS (LOS E).

B. NATURAL ENVIRONMENT

1. Geology and Soils

a. Geology

The study area is underlain by the Devonian age Sebago Batholith, a large igneous intrusive rock formation (Hussey 1981). The bedrock is composed of massive to moderately foliated biotite-muscovite granite. Blanketing the bedrock is a highly variable layer of glacial sediments consisting of till, glacial-stream deposits, swamp and tidal marsh areas.

A portion of the Gray-New Gloucester Delta, registered in Maine's Natural Areas Program (Critical Area Number 582), is present in the southeastern corner of the study area, east of Route 26. The Delta was registered because it is a prime example of an emergent glaciomarine delta with exceptionally well formed glacio-deltaic features.

Excavation of the bedrock may require blasting and heavy equipment.

b. Soils

There are two major soil associations in the study area as identified by the United States Departments of Agriculture — Soil Conservation Service (USDA-SCS) in the Soil Survey of Cumberland County, Maine (USDA-SCS, 1974) and in the Soil Survey of Androscoggin and Sagadahoc Counties, Maine (USDA-SCS,

1970). The Windsor-Hinckley-Deerfield Association covers the area from the southern portion of the study area to the southern tip of Sabbathday Lake. These are deep, excessively drained to moderately well-drained, nearly level to steep, coarse textured soils. The Paxton-Woodbridge-Hollis Association extends from the southern tip of Sabbathday Lake to the northern boundary of the study area. These are deep, well-drained and moderately well-drained, nearly level to strongly sloping, moderately coarse textured soils and shallow, somewhat excessively drained, moderately coarse textured soils.

Many of these soils are identified as prime farmland soils or hydric soils (Sections A-8, Farmlands and B-3, Wetlands).

2. Water Resources

a. Surface Waters

The perennial surface waters in the study area are Sabbathday Lake, Mosquito Brook, Westcott Brook, and two unnamed waterways from Shaker Bog. There are two small outlets from the bog: one is a natural overflow which flows southeastward, and one which flows eastward from the small rock dam. The study area has numerous intermittent, ephemeral, and seasonal waterways. The named waterways are tributary to Sabbathday Lake.

Samples of water quality and benthic communities from each of the perennial surface waterways in the study area were evaluated in August 1997. Measurements of dissolved oxygen, temperature, total dissolved solids, and pH were collected. The water samples were analyzed for total nitrogen, total acidity, total alkalinity, total phosphate, total dissolved solids, total suspended solids, and turbidity. The total nitrogen parameter was calculated from actual results for Kjeldahl nitrogen, nitrates, and nitrites. Each of the samples was analyzed using United State Environmental Protection Agency (USEPA) methods (nitrates/nitrites) and “Standard Methods, 18th edition” (APHA/AWWA, 1992).

The water quality results indicate no obvious water quality problems in these waters at the time of sample collection (MDOT 1998).

b. Aquatic Biota

Benthic macroinvertebrates were collected at the same locations as the water quality samples. A one-meter square wire mesh kick screen was used to capture the organisms for identification. A one-meter square area of substrate, immediately upstream of the kick screen, was thoroughly disturbed to dislodge the macroinvertebrates from the substrate. Organisms were collected from the kick screen and counted.

Macroinvertebrate metrics (standard statistical evaluations) were calculated according to the methods described in Rapid Bioassessment Protocols (RBPs) for Use in Streams and Rivers (USEPA 1989). Each of the seven metrics were converted to a score which facilitated the station’s comparison to a reference station. Functional feeding group information was taken from USEPA (1990). Station SB-2 was selected as the reference site because of the relatively light impacts that were evident in the macroinvertebrate community in the stream reach.

Aquatic habitat evaluations were completed at each sampling point. The habitat features, including substrate, bank conditions, and riparian vegetation were scored and summarized on field data forms according to RBP methods. The Maine Department of Conservation (1996) and the Maine Department of Inland Fisheries and Wildlife (MDIFW) (1997) were consulted for biological data for study area streams.

The macroinvertebrate samples and RBP metrics analysis indicate that the Shaker Bog outlets and Mosquito Brook are warm water streams of good water quality and productivity. The most common organisms were crayfish, damselflies, dragonflies, fishflies, alderflies, caddisflies, leeches, clams, snails, and scuds. These organisms were abundant in the riffles and pools of both streams.

c. *Stormwater Runoff*

The project will comply with the MDEP / MDOT *Memorandum of Agreement for Stormwater*. Standards for both quality and quantity in the Agreement will be met, and stormwater systems will be designed and constructed in accordance with the Standards and Commitments discussed in Section II of the MDOT's *Best Management Practices for Erosion and Sediment Control*, September 1997. The project will be considered sensitive as defined in *Part B, Guidelines for Sensitive Waterbodies* in this document. Specifically, MDOT will minimize direct discharge from new pavement into streams or tributaries, repave, stabilize all ditches and slopes and provide sediment traps.

d. *Groundwater Resources*

Localized groundwater flow direction is quite variable due to the irregular topography. The northern two-thirds of the study area drain to Sabbathday Lake; the southern one-third of the area drains to the south toward Eddy and Cole Brooks.

In the study area, significant sand and gravel aquifers are present along Sabbathday Lake and in the valley southeast of the lake (Williams 1985). These sands are very permeable and, where saturated, can yield large quantities of water. Till deposits, which blanket the bedrock in the remainder of the study area, do not have well-sorted deposits of sand and gravel and are considered poor aquifers. Yields from the significant sand and gravel aquifers in the study area are expected to be between 38 and 189 liters per minute (lpm) or 10 and 50 gallons per minute (gpm) (Tepper 1985). Depending on the thickness and composition of the overburden, wells in till may be capable of supporting small domestic supplies of less than 38 lpm (10 gpm).

The granitic bedrock aquifer underlying the majority of the study area is the main source of groundwater in the study area. Groundwater movement is controlled by the distribution and characteristics of brittle fractures in the bedrock. The highest yields are found where the bedrock is extensively fractured. The bedrock aquifer is capable of supplying small domestic needs (Caswell 1987). The Maine Geological Survey's Bedrock Water Well Database has hydrologic information on 38 wells in the study area (1997). The database is not comprehensive and was last updated in 1990 and 1991. It does not include sand and gravel aquifer wells. Well depths range between 13.7 m (45 ft.) and 201 m (660 ft.) with the majority of the wells being less

than 91 m (300 ft.) deep. Reported well yields range between 0 and 473 lpm (0-125 gpm). Regional bedrock groundwater studies show a median well yield of 19 lpm (5 gpm) for bedrock wells (Loiselle 1995).

No community water supplies are present within the study area. The Maine Drinking Water Program identified two noncommunity, non-transient supplies in the area: Buddy's Store and the Fraternal Order of Eagles (Maine Drinking Water Program GIS 1997). Residents and businesses within the study area obtain their water from private wells or springs.

The Shaker Village obtains its water supply from a spring approximately 15 m (50 ft.) to the west of the Shaker Library. Water is pumped from the spring to a storage tank on the hill approximately 153 m (500 ft.) west of the spring.

3. Wetlands

A preliminary assessment of the study area was performed using existing hydric soils data and mapping, National Wetland Inventory (NWI) mapping, aerial photography, and topographic mapping. Detailed field investigations were conducted using the routine on-site determination method as described in the *1987 Army Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987). Field investigations of the study area were conducted between August 4 and August 12, 1997. Areas within the proposed 50 m (150 ft.) corridors of the build alternatives were field checked for wetland conditions. Wetland boundaries were identified and delineated based on parameters for vegetative composition, soil development, and hydrologic character.

Forty-seven wetlands and five waters of the U.S. were identified and delineated (Appendix B). The wetlands were all palustrine with one exception: the lacustrine fringe wetland associated with Sabbathday Lake. Five waters of the U.S. were seasonal streams which had clearly defined channels.

High value wetlands in the study area are found at Shaker Bog. The Shaker Bog wetland is a large peat wetland which includes forested bog and dwarf shrub bog habitat, interspersed with areas of open water. Moderate value wetlands in the study area are the wetlands around the Shaker Bog Outlet, Mosquito/Westcott Brook, and an area north of Colebrook Road and to the west of existing Route 26.

A jurisdictional determination was conducted on September 9, 1997 by the USACOE and USEPA. Concurrence on all wetland boundaries was given, with the exception of a minor change to the boundary of wetland number 34. The boundary was modified the same day and the current mapping reflects the final results of the jurisdictional determination (MDOT 1997).

4. Vegetation

The vegetation of the study area is typical of that found in rural areas of southern Maine. Forest land is the major land cover, with open water, wetland, and developed areas as the other major land cover categories. The forest land within the study area is typical of the region in terms of species composition. The study area is domi-

nated by forested upland vegetation, which consists mainly of a mixed hardwood/conifer forest habitat (Figure III-6). The study area is dominated by the northern hardwoods forest type.

The forest lands in the study area are mainly well-established second growth forests (Figure III-7).

The Shaker Bog is a large peat wetland which includes forested bog and dwarf shrub bog habitat, interspersed with areas of open water. The forested bog habitat is found along the perimeter of the bog and is dominated by a ground layer of sphagnum and three-seeded sedge with black spruce trees. Additional perimeter areas and islands within the bog are characteristic of the dwarf shrub bog habitat, with leatherleaf, cottongrass, labrador tea, and bog laurel as typical species which grow on a hummock/hollow surface.

The study area contains abandoned agricultural lands, especially south of the Shaker Village to the west of Route 26. These areas range in seral stage from very early successional old-fields dominated by grasses to late stage old-fields with dense scrub-shrub vegetation.

Other vegetation types within the study area include turfgrass and landscaped areas surrounding developed areas.

5. Wildlife

Important fish habitat, as defined and mapped by MDIFW, includes Sabbathday Lake, Westcott Brook, and Mosquito Brook. Sabbathday Lake is designated as a high value fish habitat, which means it contain relatively large amounts of high-quality habitat for economically important species and they receive a high amount of fishing pressure.

Figure III-6, General Forest Type % Composition of Androscoggin and Cumberland Counties, Maine 1995

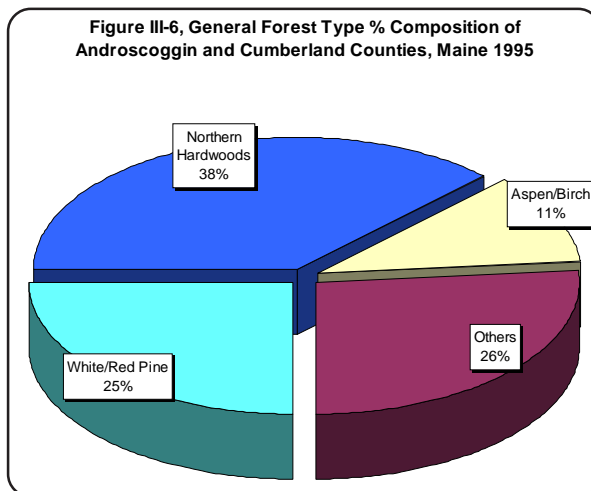
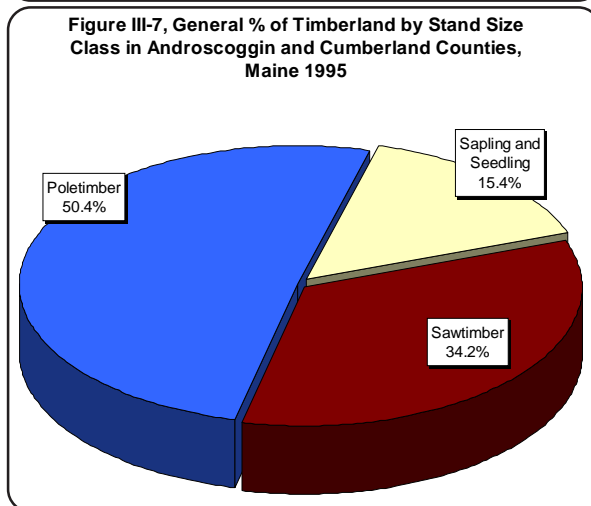


Figure III-7, General % of Timberland by Stand Size Class in Androscoggin and Cumberland Counties, Maine 1995



Source: Griffith and Alerich, "Forest Statistics for Maine, 1995".

Sabbathday Lake supports both warm water and cold water fisheries. Principal species are largemouth bass, rainbow smelt, and brown trout. Other species present include chain pickerel, sea-run alewives, common suckers, and brook trout. Sabbathday Lake is a popular destination for open water anglers and ice fishermen.

The largest block of relatively unfragmented wildlife habitat in the study area exists from Shaker Bog to the southern end of the study area on the west side of Route 26. This region is comprised of a relatively undisturbed mix of forested and wetland habitats, and include Westcott and Mosquito Brooks. Signs of wildlife, including whitetail deer and moose, were observed in this area. This block of habitat is bisected by Colbath Road, Quarry Road, and Pond Road; traffic volumes on these roads are low and do not impede wildlife movement. Logging activity in the southern portion of the area diminishes the current value of the habitat. Other large blocks of unfragmented wildlife habitat are north of Sabbathday Lake and around the wetlands near Mayall Road.

6. Threatened and Endangered Species

An assessment for the presence of threatened or endangered species was conducted via direct coordination with the Maine Natural Areas Program, the MDIFW and the U.S. Fish and Wildlife Service.

The results of the agency requests indicated that there are no known protected animal or plant species in the study area. The U.S. Fish and Wildlife Service indicated that there are no known federally-listed or proposed, threatened or endangered species in the study area (MDOT 1997). No further consultation under Section 7 of the Endangered Species Act is required.

7. Floodplains

The Federal Emergency Management Agency (FEMA) has identified two locations in the study area as flood prone. FEMA floodplain studies and mapping were completed for the town of New Gloucester in 1982 and for the town of Poland in 1996. FEMA did not calculate flood elevations within the study area. The floodplain mapping was produced by FEMA on an “approximate basis.”

The area identified as Zone A (areas subject to the 100-year flood) is a portion of Mosquito Brook at its crossing of Route 26 (Figure III-8). The area extends along Mosquito Brook from approximately 487 m (1,600 ft.) west of Route 26 to approximately 518 m (1,700 ft.) east of Route 26 where the stream connects with Sabbathday Lake.

Shaker Bog is shown on the FEMA mapping as Zone X; an area subject to flooding during the 500-year flood event. During a 100-year flood event, flood levels in the area would be less than 0.3 m (1.0 ft.) in depth. Other small streams and wetlands in the area may be susceptible to localized flooding during substantial precipitation events.

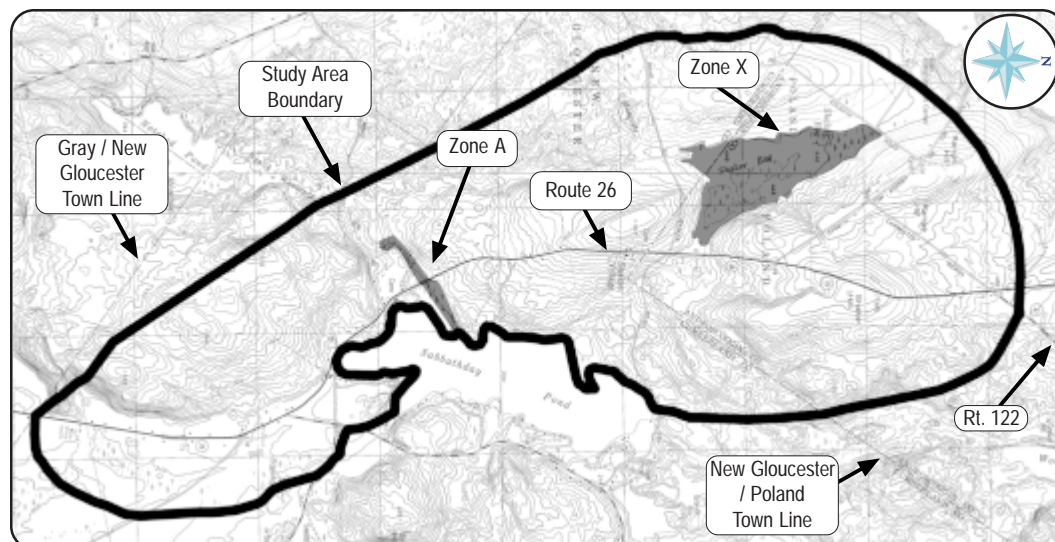


Figure III-8, Floodplains
Source: Federal Emergency Management Agency, 1982 and 1996.

Scale 1:60,000

C. HAZARDOUS WASTES OR MATERIALS

A Phase I Site Assessment was completed to identify areas of known or possible contamination from oil or hazardous materials that might affect the selection of a build alternative (MDOT 1997).

A site reconnaissance was performed on October 14, 1997 to verify the data and identify additional areas of possible concern. Aerial photos were used to evaluate undeveloped portions of the study area. Once a build alternative has been selected, this information would be used to assess whether additional site investigations are warranted. Additional studies, if warranted, would be performed during final design to determine how contaminants might impact right-of-way acquisition, construction costs, and worker health and safety.

A number of known or potential areas of contamination were identified. Data contained in the MDOT reports and memos identified eleven potential sites: three convenience stores with underground storage tanks (USTs), five automotive repair and salvage operations, a building supply company, a building contractor, and a small retail business complex.

Sixteen USTs at five locations have been registered with the MDEP. Of those registered, ten are listed as having been removed. The Plaza convenience store in Poland and Buddy's Store in New Gloucester each maintain three active tanks for retail sales of gasoline and diesel fuel.

During the interviews with local residents and officials and the site reconnaissance, several additional potential areas of concern were noted: an area of fill and domestic waste near the intersection of Brackett Road and Route 26, the Shaker dump near the outlet of Shaker Bog, the former Shaker mill and blacksmith shop east of Route 26 and north of Outlet Road, and cars and automotive parts at residents along Route 26.

D. NOISE

Noise measurements were taken in accordance with techniques described in the FHWA Report Number FHWA-DP-45-1R, Sound Procedures for Measuring Highway Noise: Final Report, at sites within nine Noise Sensitive Areas (NSAs) on August 10-12, 1997 (Figure III-9). These measurements were used to determine ambient (background) noise levels at locations remote from highway traffic influences and to calibrate the noise model for sites influenced by traffic generated noise.

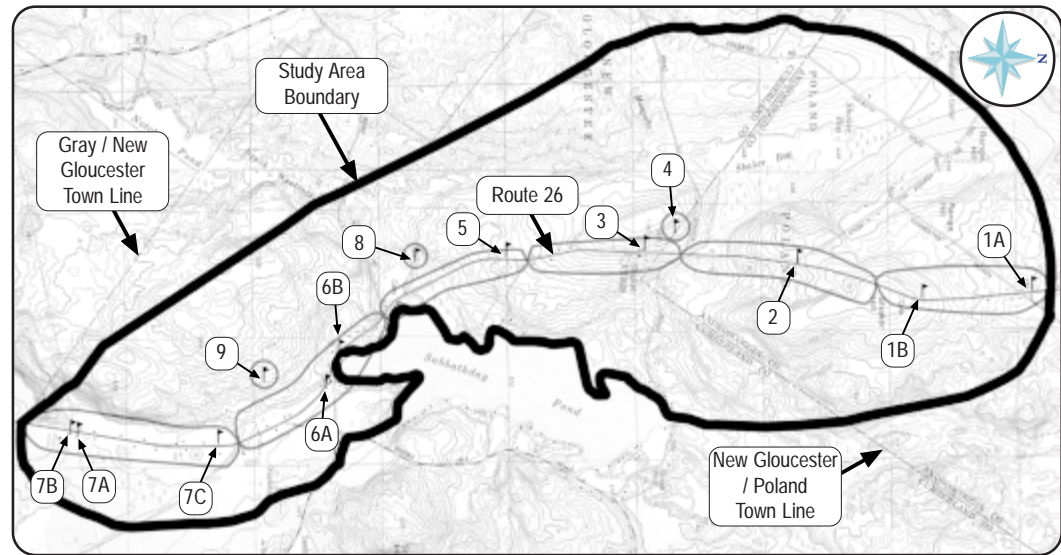


Figure III-9, Noise measurement sites and noise sensitive areas.

Scale 1:60,000

— Represent noise sensitive area boundaries

Measured noise levels ranged from 38 to 44 decibels (dBA) in the more remote areas, to 68 dBA at sites adjacent to Route 26. Traffic volumes and compositions (i.e., number of automobiles, medium trucks, and heavy trucks) were recorded simultaneously with the noise measurements and used to calibrate the noise model at sites along Route 26. Measured levels indicate the variation of noise levels within the corridor based on factors such as volume, time of day, and percent of trucks. Rolling terrain, specific highway grades, queuing of vehicles, periods of low or no vehicles, and the effects of heavy trucks are other conditions which affect noise in the study area.

The modeled levels were predicted using the FHWA STAMINA2.0 Noise Prediction Model for calibration purposes. Modeling inputs were derived from the observed traffic volumes and speed estimates during the measurement period at each site. In general, reasonable model calibration (modeled versus measured levels within 3 dBA) was obtained for peak hour conditions. The only differences occurred at Site 1B where speeds vary considerably due to the influences of heavy trucks climbing the southbound grade and in areas where periods of low or no traffic occurred during the measurement period.

E. AIR QUALITY

Microscale analysis of carbon monoxide (CO) is required to evaluate the build alternatives in relation to the National Ambient Air Quality Standard (NAAQS). The one-hour NAAQS value for CO is 35 parts per million (ppm); the eight-hour NAAQS is 9 ppm. Existing and proposed peak hour CO levels were predicted using the EPA's CAL3QHC computer model and emission factors generated by the EPA's MOBILE5a(H) computer model. Input used in these models reflect worst case meteorological (i.e., wind speed, stability class, etc.) conditions and traffic data. The model was run for each site with wind direction varied in one degree increments. A background concentration of 4.0 ppm was used (MDEP 1997). Predictions were performed for 85 analysis sites (the same sites used for the noise analyses). The maximum existing one-hour CO concentration was 5.3 ppm. Since the maximum one-hour value is less than the eighth-hour NAAQS, no eight-hour prediction was necessary.

F. CULTURAL RESOURCES

The evaluation of cultural resources focused on the identification of potentially important historical and archaeological resources and an assessment of the potential impacts generated by the project alternatives. Under Section 106 of the National Historic Preservation Act of 1966 (NHPA) [16 USC 470], Federal agencies are required to consider the effects of their actions on historic properties. (For a complete description of cultural resources in the study area, refer to Appendix A, Section 4(f) Statement).

1. Archaeological Resources

A Phase I Cultural Resource Survey was completed by the MHPC to identify areas of potential archaeological importance throughout the study area. Several potentially historic archaeological sites are within the study area, however, none of these sites are along the build alternatives.

2. Historic Resources

A historic structures inventory was completed during the summer of 1997 by the MHPC. Three historic properties were identified as meeting the criteria for listing on the National Register of Historic Places, (Figure III-10).

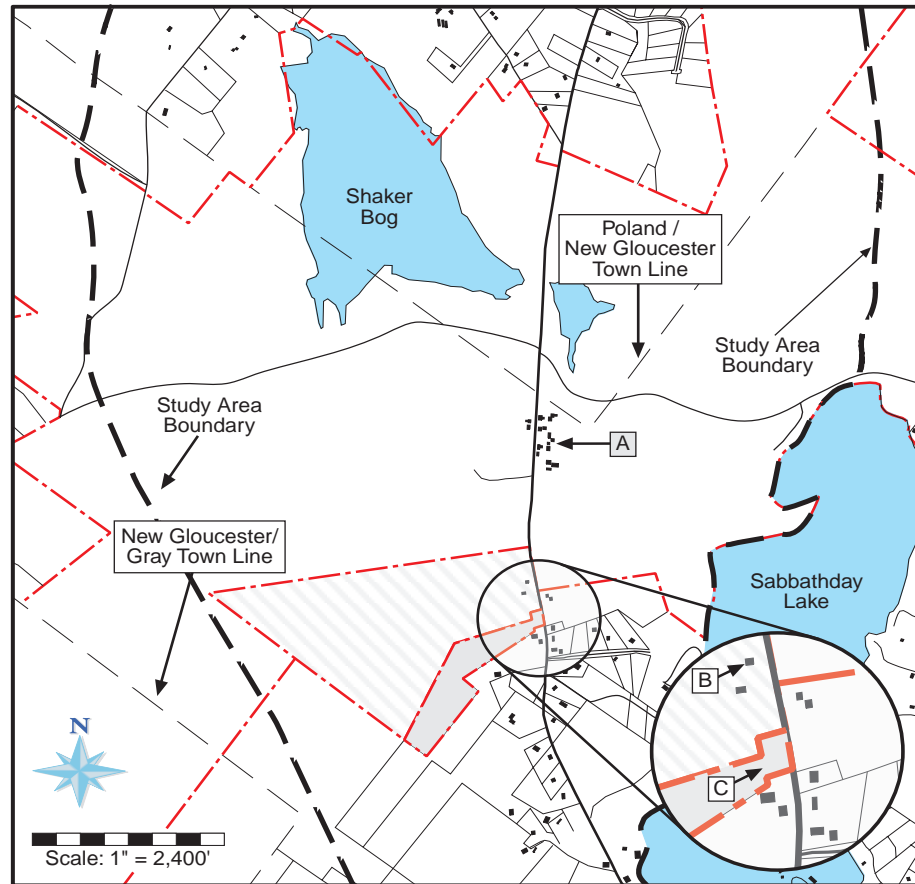


Figure III-10, Historic properties; A) The Shaker Village, B) Frame Farmhouse C) Colonial-Style Farmhouse.

■■■■■ = Historic resource boundaries

The three properties are:

- A late 19th century frame farmhouse to the immediate south of the Shaker Village; this property includes a small frame barn (Photo III-1). This property is eligible under *Criterion C* for architectural significance.



Photo III-1, late 19th century frame farmhouse

- A late 19th century colonial-style farmhouse including a small barn and garage (Photo III-2). This property (lot 1-37) is also eligible under *Criterion C* for architectural significance.



Photo III-2, late 19th century colonial-style farmhouse

The Shaker Village is listed on the National Register of Historic Places and designated as a National Historic Landmark (Photos III-3 to III-7). These classifications were granted in 1974. The Sabbathday Lake Shaker Village is a collection of late 18th and 19th century structures associated with the only remaining active Shaker religious community in the United States. The Shaker Village, with its museum, library, store, exhibits, guided tours, and special events and programs, is a popular tourist attraction. The Shaker Village is open to the general public from Memorial Day through Columbus Day. The Shaker Village is surrounded by agricultural fields, an orchard, gardens, pasture, and forested lands.



Photo III-3, Shaker Library, built in 1880

These resources are good examples of New England rural architecture and, in the case of the Shaker Village, provide an important link to the Nation's architectural, artistic, and historical past.



Photo III-4, Shaker central dwelling house, built in 1884



Photo III-5, Shaker Meeting House, built in 1794



Photo III-6, Shaker Museum (Boys' Shop), built in 1850



Photo III-7, Stable at Shaker Village, circa 1847